

THE CHEMIST

March, 1958

VOLUME XXXV



NUMBER 3



Dr. Glenn E. Ulliot, F.A.I.C.
*Accepts Honor Scroll of Pennsylvania AIC Chapter
from Dr. Henry B. Hass, AIC President*

(See Page 87)

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Deadlines for *The Chemist*

The deadline for the May issue of *The Chemist* is April 10th. Advertising copy for May should be received not later than April 15th.

THE AMERICAN INSTITUTE OF CHEMISTS does not necessarily endorse any of the facts or opinions advanced in articles which appear in *THE CHEMIST*.

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TO COME IN APRIL

The April issue will contain the membership list of The American Institute of Chemists; its constitution and by-laws, objectives, and code of ethics.

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EDITORIAL

Los Angeles in April

Dr. Frederick G. Sawyer, F.A.I.C.

Vice President, Jacobs Engineering Co., 774 East Green St., Pasadena, California

FABULOUS is the word for Los Angeles, this Wonderland of the West! For our memorable AIC meeting of all time, make your reservations now for the Thirty-fifth Annual Meeting, April 10-11, with headquarters at the Ambassador Hotel.

You have heard much about Los Angeles. It is all true. Come and see for yourself! Take all the superlatives you can think of; roll them together; wrap in tinsel; and multiply by infinity—and you have a meager idea of what this Palm Paradise holds in store for you in April!

You should know something about the history of this host city, so we have compiled data selected from learned sources. You may find it difficult to check some of the facts, so why bother? Take our word for it.

"El Pueblo de Nuestra Senora la Reina de Los Angeles de Porciuncula" was founded September 4, 1781. Inability to pronounce the name of the place for 150 years was a frustrating experience for the early settlers. So much so, that frustration complexes became endemic. The disease spread as more and more refugees from eastern sheriffs arrived.

One bright day, a local chiropractor named Freud saw a remunerative future in manipulating complexes. The world, well, Los Angeles anyway,

beat a track to his hacienda in search of relief from gastric upset, tell-tale nerves, burning throat, and klieg eyes. There are now 0.374 psychiatrists for every family.

Just about when the natives were learning to pronounce Los Angeles, some characters outfitted with puttees, kodaks, and megaphones began combing the hills for location shots. Many hysterical heroines later, a new word was added to the vocabulary—Hollywood. Everyone began living (and dyeing) as the stars did. Then came quiz programs and nauseating commercials. The intellectual fate of the nation was at stake. There was only one way out: Spread the symptoms across the land. Cure by dilution!

Los Angelenos now look to the H-bomb for solace. One local firm is doing a land office business selling reservations on future space satellites. As you can see, there is a continuing challenge in Southern California for men interested in cerebration. Come on out and feel normal again.

The Program

The AIC Program is based upon the general theme, "The Chemist and the Public." Papers will enlarge on the role of the chemist in national defense, public education, and the com-

EDITORIAL

munity, and will be given by outstanding speakers from throughout the nation. A glance at the program will convince you that a visit to Los Angeles in April will be rewarding.

Besides your fellow chemists, a whole new world of fun and fascinating sights awaits you. See Hollywood with its gay night spots and national broadcasting and television studios. Between professional sessions, spend lazy hours relaxing in the sun. Explore the colorful desert, the luxurious residential areas, orange groves, and year-round flowering gardens. These are not ethanol-induced dreams!

Distaff Diversion

All of you wonderful wives are going to live and breathe like the movie stars while your husbands discuss their profession, its meaning and responsibilities. Many public tours are available. Enjoy the romantic and beautiful trip through Palos Verdes Estates, the world-famous Marineland, the Wayfarers Chapel overlook-

ing the blue Pacific at Portuguese Bend, the Huntington Gardens and Library, historical San Gabriel Mission. . . . Just make sure your husband doesn't plan his Los Angeles trip alone. Why should he have all the fun? . . . And there is Disneyland, the Hollywood Bowl, Griffith Park Planetarium, fascinating Olvera Street with its old Mexican atmosphere, Pasadena's Rose Bowl, Mount Wilson Observatory, and Knott's Berry Farm!

What about smog? While pouring over some recent findings of meteorological importance with respect to smog formation, Prof. Adolph Quinceplat of Cucamonga State Normal was overheard to mutter in an unguarded moment, "Los Angeles Ueber Alles." Marilyn Monroe hasn't allowed smog to bother her, so why should you? Besides, there won't be any around in April—Monroe, that is.

We'll welcome you in Los Angeles!

Special AIC Announcements

Program Preview

Thirty-fifth AIC Anniversary Meeting

Date: April 10-11, 1958

Place: Ambassador Hotel, Los Angeles,
California

Theme: The Chemist and the Public

April 10 (Thursday)

9:00 a.m. **Registration**

9:00 a.m. **Coffee Hour**

10:00 a.m. **Annual Business Meeting**

Annual Reports of Officers, Committees, and Chapters.

Announcement of election of officers and councilors.

Old Business

New Business

12:15 p.m. **Keynote Luncheon**

Presiding: Mr. Alfred J. Webber,
Central Scientific Co of California

Speaker: Mr. J. Lewis Powell, The
Office of the Secretary of Defense,
Washington 25, D. C.

Subject: "The Collapse of Time."

2:00 p.m. **First Professional Session**

Subject: "The Chemist and National
Defense."

Presiding: Dr. Emil Ott, Vice Presi-
dent, Chemical Divisions, Food
Machinery & Chemical Corporation

2:10 p.m. "The Chemist and Rockets"

Speaker: Dr. Robert J. Thompson,
Rocketdyne Div., North American
Aviation, Inc., Canoga Park, Calif.

2:40 p.m. "The Chemist's Place in Mil-
itary Logistics"

Speaker: Dr. A. Stuart Hunter, Army
Quartermaster Reception Center,
Natick, Mass.

3:10 p.m. "The International Chemist."

Speaker: Mr. William Q. Hull, Asso-
ciate Editor, ACS Applied Publica-
tions, New York

3:40 p.m. "The Chemist and Civilian
Defense."

Speaker: To be announced.

4:10 p.m. Discussion

6:10 p.m. **Reception to the Gold****Medalist**

Courtesy of National Aniline Divi-
sion of Allied Chemical & Dye
Corp.

7:00 p.m. **Gold Medal Banquet**

Toastmaster: Dr. Henry B. Hass,
AIC President

Speaker for the Medalist,
Mr. George L. Parkhurst, Standard
Oil Company of California

Medal Acceptance Address:

Mr. Lawrence Flett, Allied Chemi-
cal & Dye Corp., New York, N. Y.

April 11 (Friday)7:30 a.m. **Council Breakfast**

(For AIC Officers & Councilors)

9:00 a.m. **Coffee Hour**9:30 a.m. **Second Professional****Session:**

Subject: "The Chemist and Public
Education."

Presiding: Dr. Harry L. Fisher, Uni-
versity of Southern California and

Chemical Consultant.

9:40 a.m. "Movies as a Tool for Teach-
ing Chemistry."

Speaker: Mr. John E. Sutherland, Los
Angeles, Calif.

10:10 a.m. "The Chemist and the In-
ternational Geophysical Year."

Speaker: Dr. Hugh Odishaw, Nation-
al Academy of Sciences, Executive
Director of U.S. National Com-
mittee for the International Geo-
physical Year, Washington, D. C.

10:40 a.m. "Better Training of Second-
ary School Science Teachers."

Speaker: Dr. W. E. Peterson, Pro-
gram Director for Special Projects
in Science Education, National
Science Foundation, Washington,
D. C.

11:10 a.m. "Publicizing Accomplish-
ments of the Chemist and Chemical
Engineer."

Speaker: Mr. F. J. Van Antwerpen,
Secretary, American Institute of
Chemical Engineers; publisher of
Chemical Engineering Progress.

11:40 a.m. Discussion

12:15 p.m. **Institute Luncheon**

Presiding: Mr. John H. Nair, Past
President and Chairman of the
Board.

President's Address, Dr. Henry B.
Hass

2:00 p.m. **Third Professional Session**

Subject: "The Chemist and the Com-
munity."

Presiding: Dr. Frederick G. Sawyer,
Vice President, Jacobs Engineering
Co., Pasadena, Calif.

2:15 p.m. "The Chemist and Air Pollu-
tion."

Speaker: Mr. S. Smith Griswold,
Head of Los Angeles County Air
Pollution Control District

2:45 p.m. "The Chemist and Peaceful
Uses for the Atom."

Speaker: Dr. George G. Manov, Tech-
nical Director, Tracerlab Inc.,
Richmond, Calif.

3:15 p.m. "The Chemist's Participation
in Community Activities."

Speaker: Mr. Wyatt F. DeLoache,
Pacific District Manager, Public
Relations Dep't., E. I. du Pont de
Nemours & Co., Menlo Park, Calif.

3:45 p.m. Discussion

4:30 p.m. Adjournment

AIC ANNOUNCEMENTS

Thirty-fifth Annual Meeting Committee

Honorary Chairman, Dr. Harry L. Fisher, 4116 Santo Tomas Drive, Los Angeles 8, Calif.

Chairman, Alfred J. Webber, 11703 Montana Ave., West Los Angeles 49, Calif.

Program Chairmen: Dr. Emil Ott, Vice President and Director, Central Chemical Research, Food, Machinery & Chemical Corp., P.O. Box 8, Princeton, N.J., and Dr. Frederick G. Sawyer, Vice President, Jacobs Engineering Co., 774 E. Green St., Pasadena, Calif.

Arrangements Chairman, R. M. Fullaway, Standard Oil Co. of California, Box 397, La Habra, Calif.

Finance Committee Chairman, Dr. Kenneth W. Newman, Turco Products Co., 6135 So. Central Ave., Los Angeles, Calif.

Registration Chairman, Dr. Ulrich Bray, President, Bray Chemical Co., 3344 Medford St., Los Angeles 63, Calif.

Public Relations Chairman, Peter Stupin, Sales Dept., Mefford Chemical Co., Branch of McKesson & Robbins, Inc., 5353 Jillson St., Los Angeles 22, Calif.

Ladies Committee, Mrs. L. F. Pierce, L. F. Pierce Labs., 2007 Wilshire Blvd., Los Angeles 57, Calif. and Mrs. Paul W. Jewel, 3270 Benda St., Hollywood 28, Calif.

Washington Chapter to Honor W. T. Read

The Washington Chapter will present its Honor Award for 1958 to Dr. William Thornton Read, Hon. AIC, on March 18th, at the Windsor Park Hotel, Washington, D. C. The guest speaker will be Maj. Gen. W. M. Creasy, Chief-Chemical Officer, U. S. Army. Dr. Henry B. Hass, AIC President, will present the Award to Dr. Read.

To All AIC Members

The complete program of the 1958 Annual Meeting (our 35th Anniversary) will be mailed to all AIC members on March 10, together with information about hotel reservations and advance registration. Please send in Annual Meeting reservations promptly so that our Committee in Los Angeles will have time to make the necessary arrangements.

Annual Meeting programs are available to non-members of the AIC, and they will be sent to those who request them from the Secretary, The American Institute of Chemists, 60 E. 42nd St., New York 17, N. Y.

Honorary AIC Membership to Bernard Schaar

Honorary AIC Membership will be presented to Bernard E. Schaar, chairman of the board of Schaar & Co., Chicago 34, Illinois, at a meeting of the Chicago AIC Chapter to be held March 27. Presentation of the award will be made by Dr. Henry B. Hass, AIC President.

New York Chapter's Honor Scroll to Karl Herstein

The New York Chapter will present its Honor Scroll to Karl M. Herstein, Life AIC, president of Herstein Laboratories, New York, who has been active in AIC work and on Committees since he joined the Institute in 1925. Presentation will be made at the June 4 meeting of the Chapter.

New AIC Directory

The directory of AIC members will be contained in the April issue of *THE CHEMIST*. Cards requesting information for this Directory have been sent to all members. Those who have not yet returned these cards should do so immediately!

AIC members who would like to help us make this Directory self-sustaining, may do so by bringing its special advertising value to the attention of those who offer products or services to chemists and chemical engineers. Advertising space reservations for this issue should be received before March 15 if possible.

Elections

An election ballot for Officers and Councilors will be mailed to Fellows and Members of the AIC on March 10. Please return the ballot promptly so that it will be received before April first. The results of this election will be announced at the 35th Annual Business Meeting in Los Angeles, April 10, 1958.

Will You Come

Mar. 6, 1958. Twin City Chapter. Joint meeting with American Chemical Society, American Institute of Chemical Engineers, and Chemists' Forum. Town and Country Club, St. Paul, Minn. Social Hour, 6:00 p.m. Dinner 7:00 p.m. (3.75); Meeting, 8:00 p.m. Speaker, Dr. Otto Eisenschiml, F.A.I.C. "Present Day Problems of Our Profession." Reservations: Morris Kenigsberg, The Toni Co., St. Paul, Minn.

Mar. 6, 1958. Pennsylvania Chapter. Dinner and meeting 6:30 p.m. Engineers Club, 1317 Spruce St., Philadelphia, Pa. Speaker, William Q. Hull, associate editor, *Chemical & Engineering News*. "Trends in European Chemical Developments." For Reservations: (\$3.25) Victor Bellino, The Barrett Div., Allied Chemical & Dye Corp., Margaret & Bermuda Sts., Philadelphia, Pa. (JEfferson 3-3000.)

Mar. 11, 1958. New Jersey Chapter. Visit to Anheuser-Busch, Inc., 200 U.S. Highway No. 1, Newark, N. J. 2:15 pm. Annual Business Meeting and Dinner, 5:30 p.m. Carteret Hotel, Elizabeth, N. J. Reservations for dinner (\$4.00) should be made with Dr. J. F. Mahoney, Merck & Co., Inc., Rahway, N. J. FU 8-1200, Ext. 3254.

Mar. 18, 1958. Washington Chapter. Windsor Park Hotel, Washington, D. C. Reception, 6:30, courtesy of Beckman Instruments, Inc. Dinner 7:30. Honor Award to Dr. William Thornton Read, Hon. AIC. Master of Ceremonies, Dr. Carl J. Wessel. Speaker, Maj. Gen. W. M. Creasy, Chief Chemical Officer, U.S. Army. Presentation of Honor Award: Dr. Henry B. Hass, AIC President. Reservations (\$5.00): Dr. Alex P. Mathers, 1407 Russell Rd., Alexandria, Va.

Mar. 19, 1958. Baltimore Chapter Meeting. Speaker, Dr. Henry B. Hass, AIC president. Subject: "It's Your Institute."

Mar. 20, 1958. New England Chapter dinner meeting. MIT Faculty Club, Cambridge, Mass. 6:30 p.m. Speaker, Dr. Henry B. Hass, AIC President, Subject: "It's Your Institute." For information: A. E. Frost, Eastern Research Lab., The Dow Chemical Co., Framingham, Mass.

Mar. 27, 1958. Chicago Chapter. Dinner and Meeting. Presentation of Honorary AIC Membership to Bernard Schaar, chairman of the Board, Schaar & Co., Chicago, Ill. Presentation to be made by Dr. H. B. Hass, AIC President. For information: Miss Rose Marie Brunetti, Armour Research Foundation, 10 W. 35th St., Chicago 16, Ill.

WILL YOU COME

Apr. 1, 1958. Niagara Chapter. Speaker, Dr. Henry B. Hass, AIC president. Subject, "It's Your Institute."

Apr. 3, 1958. New York Chapter. Young Chemists Meeting. Details to be announced.

Apr. 9, 1958. President Hass' Reception to AIC Officers, National Councilors, Members of the Annual Meeting Committee, and their wives. Ambassador Hotel, Los Angeles, Calif. 5:30 p.m.

Apr. 9, 1958. Meeting of the AIC Board of Directors, Council and Annual Meeting Committee. Dinner 6:30 p.m. Ambassador Hotel, Los Angeles, Calif.

Apr. 10, 1958. 35th Annual AIC Business Meeting. Ambassador Hotel, Los Angeles, Calif. 10:00 a.m. Keynote Luncheon, 12:15 p.m. First Professional Session, 2:00 p.m. Reception to Gold Medalist, Mr. Lawrence Flett, 6:10 p.m. Gold Medal Banquet, 7:00 p.m.

Apr. 11, 1958. National Council and Board of Directors. Breakfast Meeting. 7:30 a.m. Ambassador Hotel, Los Angeles, Calif.

Apr. 11, 1958. 35th Annual AIC Meeting. Ambassador Hotel, Los Angeles, Calif., Second Professional Session, 9:30 a.m. Institute Luncheon, 12:15 p.m. Third Professional Session, 2:00 p.m. (See Program on preceding pages.)

May 13, 1958. New Jersey Chapter. Honor Scroll Meeting. Program to be announced.

May 16, 1958. Twin City Chapter. Speaker, Dr. Henry B. Hass, AIC president. Subject, "It's Your Institute." Election of Officers.

June 3, 1958. Niagara Chapter Meeting. Details to be announced.

June 4, 1958. New York Chapter. Annual Meeting. Presentation of Honor Scroll to Karl M. Herstein, F.A.I.C., president of Herstein Laboratories, New York, N. Y. Details to be announced.



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Dr. Johan Bjorksten, F.A.I.C., president of Bjorksten Research Laboratories, Madison, Wis., speaking at President Eisenhower's conference on technical research for the benefit of small business, stated that research is essentially of the same nature as life insurance. "The insurance company knows that so many people are to die in any one year, but they don't know who and when. The large industrial organization knows that out of a large number of research projects a certain percentage will be successful each year, but it doesn't know which and when. . . . For a small company to bet on one research problem would be the same as for an insurance company to bet all of its assets under the life duration of one single person. . . . A research venture will be a gamble out of proportion to the funds it has.

"A Research Insurance Authority, which would reimburse small firms for say two-thirds of the cost of unsuccessful research projects in return for say one-third of the profits from

successful projects, might become self-supporting, and would enable small business to undertake research with some justification." Dr. Bjorksten made it clear that he does not advocate such a federal undertaking, but was merely stating that the only way to make possible the serious participation of a small business in research is to provide a way to insure the risk.

The J. T. Baker Chemical Co. announces the appointment of Stewart Cowell as Eastern Regional Manager, at 122 E. 42nd St., New York, N. Y., and Bruno Gherardini as Western Regional Manager, at 435 North Michigan Ave., Chicago, Ill.

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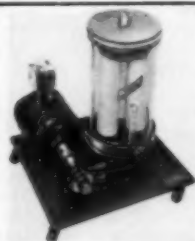
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write for illustrated folder

How to Improve the Scientific Environment

Dr. Glenn E. Ulliot, F.A.I.C.

Associate Director of Research, Smith, Kline & French Labs., Inc., 1530 Spring Garden St., Philadelphia 1, Pa.

(Presented when the author received the Honor Scroll of the Pennsylvania AIC Chapter, January 7, 1958, at Philadelphia, Pa.)

GREAT dividends will accrue to organizations which can make improvements in these ways:

(1) Establish a system of administrative control which provides an optimal environment for scientific and technical growth.

(2) Stimulate a long-range development of skills and knowledge of the personnel.

(3) Adopt better criteria of achievement.

Administrative Environment

Contrast the "simple life", which existed when I began my work, with the present. Then there were less than a dozen scientific and medical men on my staff. Our total employees were 300. It is true we covered a narrower range of research activities and sometimes we were impatient for certain facilities. On the other hand, there was a certain simplicity to our operation. Lines of communication were short and open. Exchange of ideas was easy; decision making was not cumbersome. Laboratory work could be implemented readily. There was no complex organization to overwhelm one, or an involved protocol to fathom. One soon acquired a feeling of belonging; that he could be, in part, a master of his fate and that he had

everything to gain by plunging in and starting to dig.

Today the situation has changed. We have over 300 scientific and medical personnel and nearly 3000 employees. This is wonderful, but it creates problems. This change is representative of what has happened in industrial and government laboratories, in research institutes, in academic life, and in science. We have grown big and complicated.

We accomplish much more *in toto*, but at a cost. In all large organizations, the individual is faced with a maze of regulations covering requisition of supplies, reports, meetings. He has to communicate to more people, more often. Procedures change as the organization continues to expand. Add to this the enormous increase in scientific knowledge and literature which he must know and utilize. These factors are serious problems to the individual. A large block of his time and effort goes into keeping up with organizational procedure.

What could be done? I suggest:

(1) Provide separate space and facilities for the Research and Development Division, so that housekeeping and personnel regulations can be tailored to meet the needs of the work within the division.

(2) Provide the best possible service facilities. Many persons, with technical, secretarial, and mechanical skills, if properly motivated and integrated into R & D affairs, can play a valuable role in the overall scientific effort. We have only scratched the surface in developing a technical service branch of science. Special trade schools are needed to train such technicians.

(3) Provide more parallel lines of communication and control for R & D. This means more persons who can make decisions and who have authority to act. This must be done with discretion and there must still be an overall control to avoid duplication of effort.

Often as an R and D Division grows, the line organization becomes complex. Communication can be agonizingly slow. The gap between the "boss" and the members of the research team is too great. The team should be led by someone who is able to make authoritative decisions and is not so far removed that he cannot know his staff personally. Team members should be able to identify themselves with the whole team effort and feel that it magnifies their individual efforts.

(4) Provide a task force of keen and experienced persons whose sole job is to ferret out and promote research and development ideas of promise. Too often our present staffs are unable to do justice to many potentially useful ideas or results. Suppose

a small group of men of experience, optimism, imagination, and great character could roam through the R and D Division guided by one rule only: "Accent the Positive." They would have a "whale of a time" and be a terrific catalyst to the staff!

(5) Provide better means of utilizing scientific information. Technical knowledge has become so great it is impossible for anyone to keep up with it, even in his own field. A few years ago, if one wanted to know if a certain compound had been reported in the literature, he could find it with a few hours of searching. Today, he may spend days in the library and still not be certain. We need trained scientists skilled in science information work; we need electronic equipment for recording and retrieving data. It is important to integrate science information personnel into research programs so that they may become working members of the research teams.

A Reconditioning Program for Senior Staff Members

Why not recondition our senior scientists periodically? This is the long-range development of personnel skills. Most companies have programs for encouraging junior staff men to continue education, but a limited amount of attention has been given to senior staff programs. It is time to change.

I do not mean this in the sense of reconditioning an old car! I am thinking of Pavlov's conditioned response principle. If animals are caused to respond to a signal in a certain way

by a stimulus (reward or punishment), they become conditioned to respond to that signal. The same thing happens with people. It is a big factor in everyday life.

When a new Ph.D. joins a company, it is the time of his greatest versatility. He soon finds his niche in the company and begins to specialize. Gradually, his outlook narrows. Often he has to neglect broad reading to meet the heavy demands of immediate tasks. He begins to respond to signals within the organization in a way to gain reward or avoid trouble. He is conditioned. In some ways this can be good. In others it is bad. In either case, it should pay big dividends to recondition him. Up-grading his basic knowledge and giving him a new point of view should make him a more creative person. This could be accomplished by an "Educational Leave" comparable to a sabbatical leave in the academic field.

Let us assume that a scientist will be actively engaged in his professional activities for a minimum of thirty years. Perhaps he will work another ten years, but during that time he will probably have duties less demanding of creative talents and more along supervisory lines. Let us give him one year out of every eleven for educational leave on full pay. He should be required to attend a university and to pursue a program designed to expand his knowledge and skills, and to fulfill the accepted standards of

achievement. At the end of his second study year, he will have been with the company 22 years.

What will it cost? Assume he earns \$16,000 a year. Two years' leave will cost \$32,000. Spread that over 32 years and the cost is \$1,000 per year. Overall, the increased cost will be about 8 per cent of salaries.

Right now there is a clamor for more scientists. We are really seeking increased scientific knowledge and creativity. Our industrial scientific personnel are acquiring a large population of mature persons whose basic training is 25 years or more old, and who have been specialized to meet the demands of their company's business. If all of these people had had their two years of reconditioning on educational leave, the total of their increased creativity would be equivalent to a considerable number of additional scientists.

There are other advantages. The periodic return of these scientists to our universities would bring to the professors and students a wealth of experience and knowledge not so readily available now. Greater rapport would be established between academic and industrial people. The cross-fertilization of ideas should be most productive. The impetus to achieve distinction on educational leave would be a stimulus to every scientist. The scientific assets of each institution and the nation would be increased.

Better Criteria of Achievement

One of the great problems in industry is a proper yardstick for the evaluation of the achievements of the scientific staff. Naturally, the board of directors and stockholders want to know what the staff produced that was useful and what it contributed to profit. This is basic—no profit, no company. However, it is improper to use the dollar as the sole yardstick. Instead, a number of yardsticks ought to be applied at different levels, beginning with the individual and extending through the organizational units of the R and D division. I emphasize an overall evaluation based on products and scientific achievements.

One individual may work for years on one or more problems and never produce a salable product. He should be judged on his approach, his results, and his interpretation of the results. If his work is publishable, the evaluation is easy; if not, his achievements should be reviewed by at least two competent judges and rated on scientific merit. Another person of even lesser ability may, with less effort, produce a salable product. Let us be practical. The more often he does it, the higher his rating. The important thing to remember, though, is that the work of one man may pave the way for a breakthrough by another.

The second level of appraisal is the group or team working on a problem or program. Group achievement can again be measured in terms of scien-

tific achievement or in terms of products produced. A good evaluation of group effort should be through the research director and one or two outside consultants. Sometimes a group is primarily engaged in rendering a service. Professional competency and performance must then be the basis of appraisal.

Next, we consider a department. In my company the Laboratory Department is composed of a number of sections. Thus we should look at the number of potential products and the total publications coming from the laboratory staff.

Finally, the R and D Division should be judged by the number and value of the products it provides for sale and the total number of publications from the division.

I have a purpose in advocating a dual standard of appraisal, i.e., product and scientific achievement. If the staff knows that these two standards apply, it has a double incentive. Well conceived and competently executed work can be successful in two ways and always in one. Individuals will resist being sent down blind alleys but yet they will willingly attack the difficult problems. There will be an incentive for exercising self-discipline, because a man who ends up with neither product nor scientific achievement knows where he must stand. He can continually appraise his own program; and he will have reason to do so in an orderly manner.

As the appraising shifts upwards

from the individual through levels of organization, larger and larger blocks of research and development effort should be lumped together, but still product and scientific achievement should be emphasized. Obviously, salable products from the division become a dominating factor but there will be a parallel achievement in publications from the division. If neither is achieved, something is wrong. If publishable (not necessarily published) results are coming through, and if management is alert, products are on the way. Generally speaking, industrial research is

product oriented, but the best way to get products is to have a highly competent staff doing good research.

Conclusion

Scientific progress for our organization, and our country, is dependent on persons who have had the interest to become knowledgeable and competent in their chosen field. It is good business to provide an environment suitable to the nature of their work. Finally, we need our best scientists in high councils of government and industry to insure that our scientific resources are properly developed and employed. ♦

Conditions that Favor Creative Thought

Dr. Richard T. Arnold

Program Administrator of the Alfred P. Sloan Foundation, Inc., 30 Rockefeller Plaza, New York 20, N. Y.

(Presented when Dr. Glenn E. Ulliyot, F.A.I.C., received the Honor Scroll of the Pennsylvania Chapter, January 7, 1958, in Philadelphia, Pa.)

SO often in the popular mind science is inseparably associated with gadgetry, and this has been detrimental to the work of those who want to carry on basic investigations. The gadgets are just the essential or convenient tools. True science is really philosophical in nature, since the major goals are answers to man's "big questions": (1) What is life? (2) What are the forces, i.e., the control mechanisms in living organisms, which direct purposive growth? (3) What is the ultimate structure of the earth and universe in which we live? (4) What is the chemistry of enzymes,

brain cells, protoplasm, etc.?

To a considerable extent, the fantastic achievements in science, especially during the last fifty years, have tended to overshadow the creative thinking by other professional people, the engineers, architects, economists, lawyers, industrial executives, and others who have played such an important role in shaping our modern world. Creative thinking certainly does not belong entirely to the private domain of science, but it is a necessary characteristic of a true scientist. We may now ask ourselves about the major driving forces which promote creative

thinking at the abstract levels which we have in mind. The late Franklin Delano Roosevelt has been quoted as saying:

"Happiness lies not in the mere possession of money; it lies in the joy of achievement; in the thrill of creative effort."

Tolstoy, who was a master at analyzing people, as well as describing them, says in his classic book, *War and Peace*:

"The combination of causes of phenomena is beyond the grasp of the human intellect. But the impulse to seek causes is innate in the soul of man."

The whole subject of creative thinking, now that our very survival depends upon it, confronts us every day in newspapers, magazines, government publications, and even in speeches by the President. Many paper backed editions of excellent books on the subject, such as Brewster Ghislin's, "The Creative Process," are available at prices from 35 to 50 cents.

Today there is concern about our difficulty in discovering intellectual talent at an early enough age and developing this to its fullest potential. But surely this is only one side of the coin. The other concerns the opportunities given to the scientist after his potential to do creative thinking is quite well established and he is ready to launch into a career.

Every professional scientist who is worth his salt must strive to capitalize on his own abilities. But, in return, he should expect that his employer will assist by providing proper fa-

cilities in the form of needed apparatus, effective library, etc. What, however, is needed above all else is a stimulating professional environment and encouragement. Many companies, whose future growth depends markedly upon the creative output of their scientific staffs, have done wonders in providing elegant physical facilities, personal and professional services, and libraries which are the envy of many faculty members in our best educational institutions. Important as these items are to a scientist, they are not enough.

In the long run, whether a young and talented scientist grows professionally and becomes a real asset to his company, or drifts into a lethargic state of unproductive disillusionment, depends to a considerable extent upon the attitude which the administrative officers of the company and his director of research have toward his creative efforts. Fortunately, many of our large and successful companies have long since recognized this point, and a remarkably fine *esprit de corps* is to be found in their scientific laboratories, especially where these are associated with the chemical, electrical, and pharmaceutical industries.

Every major civilized nation from the beginning of time has made substantial contributions through the creative effort of its people, and most of what we have today rests solidly upon, or has grown out of, these foundations. The rise of modern science in

CONDITIONS THAT FAVOR . . .

Western Europe during the past three centuries has been especially spectacular. Nevertheless, the excellent work done in Japan on scientific topics ranging from natural products to meson theory; the recent proof of the non-conservation of parity by two Chinese scientists working in the U. S., and the many contributions by Indian scientists reminds us that the Caucasian race certainly has no monopoly in the area of creative thinking in the natural sciences.

With few noteworthy exceptions, our own contributions to science have been made during the past forty years. The large number of Americans who have won Nobel Prizes since 1930, and the high quality of our scientific journals at present leaves little doubt that as a nation we have gained our scientific spurs.

Many erroneous ideas about scientific research are harbored in the minds of some of our most intelligent laymen. One of these is that any research done in an academic laboratory is necessarily fundamental and that done in all industrial laboratories is of an applied nature. This is poppycock. People who adhere to this silly notion seem to be unaware of the increasing number of basic contributions reported in our journals from industrial research laboratories, and that fact that three recent American Nobel Prize winners carried on their investigations at the Bell Telephone Laboratories at Murray Hill, N. J. To be sure, the picture is spotty and anything but uni-

form. The trends, however, seem clear.

Dr. W. W. Turnbull, executive vice president of the Education Testing Service, reported in the *New York Times* (Dec. 8, 1957) that,

"We are now interested in developing examinations that will test such qualities as creativity, persistence, reasoning power, memory and the ability of the mind to relate and to integrate."

Perhaps at the Ph.D. level such testing is not so necessary, since the candidate will already have indicated to his senior colleagues whether he has creative potential.

Fortunately, our most progressive industrial research directors recognize, as do most of our academic institutions, some of the conditions which favor creative thought. Creative thinking is a chance affair and cannot be put on a production schedule; nor does it lend itself to regimentation nor adjust itself to a 30-40 hour week. All we can hope to do is to pick the man with latent ability, and try to establish an environment for him which maximizes the probability that truly original thinking will follow.

Henri Poincare, the famous French mathematician, claims that one of his most brilliant ideas came to him as he was stepping on to a bus to start a vacation. Kekule's own account of his conception of the benzene ring, while under the influence of a certain amount of alcohol, is well-known. That solutions to difficult and abstract problems often came not during

periods of concentrated effort but as afterthoughts when the mind is supposedly resting, is well-documented.

Dr. Ulliyot has been a close personal friend since our graduate student days at the University of Illinois, twenty-three years ago. I have watched his professional growth with pride, admiration and a great deal of personal satisfaction.

In addition his fine published researches, dealing with a wide variety of substances of pharmacological in-

terest, Glenn has given unstintingly of his time and energy to several divisions of the American Chemical Society, both at the local and national level, and is admired as a leader and friend among those with whom he works. That he and his close associates who direct the research and administer the affairs of Smith, Kline and French Laboratories recognize creative ability and how to nurture it, is obvious to any scientist who visits that handsome structure on Spring Garden Street, in Philadelphia.

Presentation to Dr. Ulliyot

Dr. Glenn E. Ulliyot, F.A.I.C., associate director of research Smith Kline and French Laboratories, Philadelphia 1, Pa., received the Honor Scroll of the Pennsylvania Chapter at a dinner held January 7, 1958, at the Penn Sherwood Hotel, Philadelphia, Pa.

Marcus Sittenfield, consulting engineer, and chairman of the Chapter, presided. Dr. Richard T. Arnold, program administrator of the Alfred P. Sloan Foundation, Inc., spoke on "Conditions that Favor Creative Thought" and introduced Dr. Ulliyot. Dr. Henry B. Hass, AIC president, presented the scroll to Dr. Ulliyot, who responded with an address on "How to Improve the Scientific Environment." (See preceding pages for these papers.)

The citation to Dr. Ulliyot reads:

In recognition of personal research accomplishments, inspirational leadership of co-workers, contributions to the scientific literature, unselfish participation in scientific societies; and especially genuine interest in people — their problems and aspirations.



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Seven Prerequisites for Prospective Chemical Executives

Ernest Hart

*President, Food Machinery and Chemical Corporation,
161 E. 42nd St., New York 17, N. Y.*

(Presented at a recent meeting of the New York AIC Chapter)

CERTAIN basic prerequisites most likely to be involved by management in evaluating prospective chemical executives are:

- (1) The accident of birth leading to good health and a strong constitution;
- (2) The matter of aptitude;
- (3) The power of decision making;
- (4) The sense of responsibility;
- (5) Family life;
- (6) Communications;
- (7) Motivation.

Health

If you aspire to management in the chemical industry, your chances are best if you are born of the right kind of parents. This refers to the point of your heritage of physical, constitutional, and mental capabilities, as well as your early training in the home. You should, if possible, be the youngest child in the family. Statistically it is clear that the older the parents at the time of birth, the more intelligent and robust the child!

You will benefit materially if you are born at the right time in the economic cycle. When you come to maturity and complete your education, the opportunities in business will be greater if at that time you are at the right point of the cycle! In my

case, when I was graduated from college the agricultural chemical industry was for the most part a patent medicine show, on the threshold of being developed into a major industry as the technical revolution engulfed agriculture. So I had the lucky opportunity to participate in the development and growth of the agricultural industry during its most progressive period.

Few executives have succeeded for long without basic, robust, good health. This is the most important prerequisite of all. You can have all of the others and not succeed. The strain of decision making, of competition, of long hours, frustrations, travel, and numberless other physical and mental requirements are terrific. Therefore, it is essential to begin early to develop good health practices in building a strong body and a clear mind, and to avoid all excesses. Be grateful to your ancestors for whatever degree of constitutional and mental capabilities you have been endowed.

Aptitude

I have long contended in dealing with hundreds of people in practically all categories of business that no matter what the job ahead, there must be in the background an inborn ap-

titude for the work. This is particularly true of management. Management is an art as well as a science. Success will elude those who do not have natural aptitude for solving some of the problems and handling some of the people that are the daily chores of management. People who love their work are by and large the type that have natural aptitude for it.

Some years ago, while in a Chicago night club, a part of the entertainment was a violinist who did about the most wonderful things with the violin that I had ever heard. He looked, however, like a nitwit. Being enthralled with his music, I said to myself, if that fellow can play the violin, I certainly can! So I bought an expensive violin, arranged to take some lessons at home evenings, and started on the road to become a violin virtuoso. But the enterprise was a complete failure, primarily because I had no gift whatever for that art!

Decision Making

Decision making is one of the most difficult of all management activities. There are many formulas for decision making, but in most cases it does not lend itself entirely to formulas, and any decision made when one is not in full possession of the facts is likely to be faulty.

In dealing with corporate decisions with respect to money, it must be decided whether or not the stockholders' interests are being properly protected. The decision maker must be completely familiar with the competi-

tive situation and with the industry situation when making decisions pertaining to capital expenditures. He must also decide whether the money involved in the expenditure could be used in other directions to greater advantage. And he must decide about the availability of people who are to be involved in the implementation of such an expenditure, and scores of similar items. However, the most trying areas in decision making concern the corporation's employees. In a promotion, there are frequently four or five possible candidates; when one is selected, it can bring about a downgrading of the other candidates. In fact, decisions involving personnel and labor problems are the most challenging of any that management must make, primarily because they deal with people and not with things.

To participate in decision making, one must have courage, integrity, devotion to principle, and a high degree of humanitarian responsibility. In a corporate enterprise, the members of management must always remember that they are trustees of the stockholders' funds and that indiscreet or wrong decisions can bring grief and trouble to scores of trusting people.

Let us figure it this way. Our company has 15,000 employees. Statistically the average family is $3\frac{1}{2}$ people. This means that our employees, who primarily depend upon their income from our company, involve approximately 52,000 people.

SEVEN PREREQUISITES . . .

Their hopes and ambitions, their food, clothing and shelter depend to a major extent upon right decision making at top level. In addition, we have 16,000 stockholders who have entrusted their funds to us. While some of these do not depend entirely on their income from this source, it is an important part of the income of many, some of whom are widows, women, and children, whose standards of living are somewhat dependent upon our success.

Add to this the thousands of families involved in the businesses from whom we purchase supplies, and you can easily get up to a round figure of 100,000 people dependent upon the decisions made in one company alone. This is a great responsibility and the decision maker must at all times be sure that the interests of these people are taken into account. Since experience, integrity, and aptitude are major ingredients of decision making, responsible management will always explore these elements as prerequisites to evaluating prospective executives.

Sense of Responsibility

A sense of responsibility is an important prerequisite. This is a characteristic which can be developed by accepting responsibility wherever possible in your present job and by taking the consequences of the outcome. It can be developed by studying the responsibilities of those in the jobs ahead of you, observing the manner in which they discharge their responsibilities. It can never be acquired

by the practice of ducking responsibility or "passing the buck." A real sense of responsibility is usually generated by dedication to one's job, dedication to the free enterprise system, and loyalty to family, company, and country. This prerequisite applies not only to management but to any job in any place, if one is to succeed. Therefore, a sense of responsibility is one of the criteria upon which management will judge your future potential.

Family Life

Wrapped up in the matter of all of the items mentioned is the way you conduct your own family life and private affairs. Management is looking more and more into the family life of its candidates for promotion as a means of judging how the candidate is likely to conduct the company's affairs. The successful administration of a family and home is the best demonstration of what to expect from a man in conducting a business. In many cases promotions have not been



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made due to the candidate's mismanagement of his private affairs. I would admonish you to keep your house in order.

Communications

The ability to communicate with others is an important prerequisite. Business is primarily people, not brick, mortar, and machinery. Unless you are able to properly communicate to others your thoughts, ideas, orders, and reasons for action, you are at a distinct disadvantage. Thus a person who is able easily, concisely, and forcefully, to communicate with others by oral or written word, has a significantly better chance to gain acceptance. The art of communication is one which should be constantly cultivated and developed. Skills in this direction are an important criterion in management's evaluation of its people.

Motivation

Finally, we come to the question of motivation. In studying crime, the police look for the motive. In studying people, management also looks for the motive: Is their ambition for advancement based on money or power or self-emulation? Or is it based on sincere service to others and a desire to contribute something to the good of others? In a word, is the motive for promotion and success completely selfish or completely unselfish or a reasonable combination of both? Only the candidate can analyze himself in this direction, but by his acts

and performance he is judged by management with respect to his true motives in seeking advancement.

These are by no means all of the elements judged by management when considering candidates for executive positions. But I shall mention one point from the other side of the fence which you should consider. All that I have said will come to nought unless you are working with a corporate management which is dedicated to these principles. If you have ambitions in the direction of management, it is as vital for you to analyze your own management as it is for your management to analyze you.

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Understanding the Creative Process

Dr. Maurice J. Kelley, F.A.I.C.

Director, Industrial Specialties Laboratories, Nopco Chemical Co.,
Harrison, N. J.

Part V. The Stimulation of Creativity

AS creativity can be stifled or destroyed, so also it can be fostered and developed. As hostility or criticism blunts creativity, so also encouragement can make it blossom forth.

Environmental Conditions

The environmental conditions most favorable to creativity are not fully known, but are the subject of studies at a number of universities and a few business organizations. Ohmann¹ discusses the impediments to creativity imposed by the very nature of large industrial organizations, and suggests what can and is being done about it. He lists a number of these natural blocks as follows:

1. Authoritarian in design and operation.
2. Mass production emphasizes standards and fixed procedures.
3. Specialization removes the view of the *whole* job — which is so necessary for creativity. Creativity is by nature integrative, and seeks significant relationships.
4. Doers are usually separated from thinkers — line vs. staff conflicts.
5. Bigness reduces the individual's sense of responsibility; and substitutes security for creativity.
6. Power structures are built up which resist change.

Arnold² states that management's responsibility to its creative personnel

is to stimulate, encourage, assist, recognize and reward their creative efforts. Table 9 sums up the policies stressed by several authors. The adoption of these policies by business and other organizations will provide a climate that will tend to stimulate creativity.

Table 9. Environmental Conditions That Stimulate Creativity

1. **Encourage free flow of ideas** — a positive, permissive attitude; informal communication among all levels; a "listening" attitude on the part of top management.
2. **Handle all ideas discreetly** — as quantity helps quality; the more there are, the greater the chance of the really big idea emerging.
3. **Discourage the "crash" approach** to solving problems; save this effort for the true emergency.
4. **Realize that groups produce more ideas** than individuals; but that the key to creativity is the individual gifted mind. The University of Buffalo found 65-93% more ideas per man from group ideation, than from the lone-wolf approach.
5. **Realize the value of deferred judgment** — encourage venturesome thinking. Realize that poor ideas and mistakes, made during a successful quest for bigger things, are better than a "safe" status quo.
6. **Develop a spirit of optimism in the organization** — instead of a complacent or negative attitude.

(1) Ohmann, O. A. "Care and Feeding of the Creative Center: The Innovator." *Chem. Eng. Prog.* 53, 21-2, April, 1957.

(2) Arnold, John E. "Creativity in Engineering." *S.A.E. Trans.* 64, 17-23, 1956.

7. **Hold creative thinking seminars** — believe in the possibility of improving creativity.
8. **Reward exceptional creativity** — encouragement is very important. Give adequate pay to the innovator, so he won't have to switch to an administrative job in order to obtain the income he thinks he should be getting.
9. **Avoid a too-rigid organization** — or too-great specialization for gifted people.
10. **Recognize that efficiency and creativity are served by opposite means**, and that the best balance must be sought.

Proper Motivation

In her fine summary article³, Miss Lydia Strong says that the most effective motivation, for those who possess it to any marked degree, is the sheer enjoyment of the problem-solving activity. This motivation is probably present to some degree in every creative person. To the extent it is present, the less necessary are other, external motivations. But such creative persons need freedom to operate, and sufficient scope for their abilities.

Many other persons need motivation from the outside to unleash their great potential creativity. They will create, if thereby they can achieve material and social preeminence. A number of surveys conducted among research personnel would seem to indicate that researchers place opportunity for advancement and for the acquisition of new abilities above mere monetary reward. Stimulating

assignments, stimulating superiors and capable colleagues are valued higher than job security and fringe benefits.

Creativity Helps For Individual Use

There are a number of things a person can do to stimulate and improve his own creativity. Lester R. Bittel's 32 Springboards to Good Ideas⁴ is one of the best summaries of such individual helps, and some of these are listed below:

General⁵

1. **Broaden your experience:** Meet people; go to lunch with varying groups; attend meetings; take part in community activities; travel.
2. **Read — and write — a lot.** Take notes of what you are reading or listening to. It makes no difference whether you ever read the notes; they will have sharpened the mental impression anyway.
3. **Play games & have hobbies:** Bridge, chess, cryptograms — anything which requires intense mental effort. Handicrafts are better than collecting.

Specific

4. **Learn your most effective time of day — or place, or circumstance.** Early morning is often the time when the mind is sharpest and most liable to insight.
5. **Start now:** Do not delay unnecessarily. If you need more time, get up an hour or two earlier.
6. **Assume a work attitude:** Use pencil ("a crowbar for moving the mind" — Osborn) & paper ("an idea trap")

(3) Strong, Lydia "Creativity in Industry: the Care and Feeding of New Ideas," *Management Rev.* 40, 56-72, Mar. 1957.

(4) Bittel, Lester R. "How to Make Good Ideas Come Easy," *Factory Mgmt.* 114, 84-90 (Mar.) 1956.

(5) Goldner, B. B. "What's This Business of Brainstorming and Creative Thinking all About?" *Sales Mgmt.* 77, July Pt. 2, 32 1956.

UNDERSTANDING THE CREATIVE PROCESS

7. **State problem broadly:** As broadly as is consistent with the objective.
& **write it down:**⁶ If you can't, you do not understand it clearly enough.
8. **Ask important questions:** What about this? What if? Can this be changed? What is the *real* problem?
9. **Learn to withhold judgment;** be able to turn it off and on at will.

Creativity Helps For Group Use

Likewise, there are a number of things people can do to stimulate and improve their own and their colleagues' creativity in group performances, conferences, etc.

General

1. **Gain management approval:** This is not always easy to do; it is often hard to get the boss to admit the thinking of all can be improved. Even among fellow workers, there may be some suspicion and resistance in the beginning. It is advisable to move gradually, and with a promotional campaign.
2. **Positive, permissive attitude.** Idea-forming stages must be free from criticism or evaluation — in order to overcome any reticence about expressing ideas, to encourage "green-light thinking".
3. **Encourage quantity of ideas—**also the "crazy" ones. The more ideas, the greater the probability of big ones.

Specific

4. **Morning meetings best;** the mind is freshest, most creative then.
5. **Comfortable room;** to go with the informal, permissive atmosphere. Some authors say to provide opportunity to smoke, have light refreshment.

(6) Murphy Dennis. "Creative Thinking in Business." Amer. Gas J. 183, 19-22 (July) 1956.

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6. **Avoid too-great disparity in rank;** to keep lower ranking members of the group from being reluctant to express themselves freely.
7. **Avoid One-answer problems;** also those requiring a lot of calculation; also a search for possible fields for new-product research.
8. **Avoid breaking into little groups;** this defeats any meeting. Everything that is said should be important enough to be directed to the whole group.
9. **Clearly state the purpose;** never hold a meeting unless this is done at the outset, or preferably in a typewritten agenda made available beforehand.
10. **Stop on time.** Conference efficiency falls off very rapidly after the second hour. Often, creative conferences have a one-hour time limit.
11. **Concentrate on the future.**⁷ This involves risking the status quo, but progress can be made in no other way.

Creative Supervision

If an organization benefits greatly from steps taken to improve the creativity of certain selected people, how much greater gain would result if even a little more creativity could be called forth from all its people. It

(7) Stryker, P. "Can Executives Be Taught to Think?" Fortune 47, 138-41 (May) 1953.

follows, though, that a company full of greater-than-average creative people would require supervisors especially equipped to handle such people, who, as we have seen, are somewhat different from the populace as a whole.

We see this problem well when we consider the kind of supervisor needed for highly creative people, and when we consider that "the creative supervisor is the key to the productive output from a creative staff."⁸ Ohmann contrasts the highly creative person with the business executive,¹ as shown in Table 10.

Table 10

<i>The Innovator</i>	<i>The Administrator</i>
restless, unorthodox	systematic
gambles on a hunch	takes pride in his
rejects his environ-	art
ment	likes to improve
questions every-	and perfect
thing	has faith and pride
weak on follow-	in his people
through	keeps objectives in
impatient with red	mind
tape and people	
"organizational	
screwball"	

Mrs. Runner⁸ states that the creative supervisor must be a person in between the two in temperament, and he must understand completely the inner workings of a highly creative person.

The highly creative person must be free to work feverishly at the right (for him) moment on what has

(8) Runner, Jessie R. "For Creative People, Creative Supervision." *Printers' Ink* 258, 27-8, Jan. 25, 1957.

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seized his imagination; otherwise he will be frustrated and may eventually have his creativity destroyed. Often this initial enthusiasm causes him to rush into the problem; he doesn't even stop to plan. What is worse, the enthusiasm wanes or becomes transferred to some new problem, and he doesn't relish the hard work necessary to finish the job. The creative supervisor needs to know:

1. When to leave his man alone
2. How to listen: Never tell him what to do, just appreciate what he is trying to do.
3. When the times of crisis occur:
 - a. when guidance is needed—to keep him on the path to the desired end-result.
 - b. when new enthusiasm, for each successive sub-problem, needs to be kindled.
 - c. when encouragement is needed—for successes along the way, to overcome obstacles or temporary failures, or for re-direction of effort as management aims change (or when projects are terminated).

Dr. Herbert A. Shepard⁹ has discussed the destructive side of creativity, and has stated that one of the goals of management is to con-

(9) Shepard, Herbert "The Destructive Side of Creativity." *Ind. & Eng. Chem.* 49, sup 109A-13A Sept. 1957. *The Chemist* 34, 303-7, 1957.

UNDERSTANDING THE CREATIVE PROCESS

trol the consequences of creativity through an intelligent authority structure. Very often, what is newly created replaces, therefore destroys, something already established. The automobile destroyed the buggy whip. If everybody were highly creative, chaos would very likely occur. All of our systems and businesses would be disrupted. Steady production could

not be achieved under the pressure of constant, unpredictable change. The business firms that generate the best new, practical ideas are the most likely to prosper — if they remain within the limits of their organizational and financial capabilities.³ For a given company, then, the question is how much creativity can it afford — and manage.

Communications

A Legal Definition of the Professional Status of Chemists

To the Editor:

It may be somewhat surprising to learn that the question of the professional status of chemists was the ultimate issue in a litigation that reached the Supreme Court of the U. S. in 1896!

In 1885 Congress had passed a law designed to alleviate American workers from the competition of cheap, unskilled foreign labor. This act made it illegal for any employer to assist any alien to come to this country under a contract or agreement made previous to the importation or migration of such alien, to perform labor or service of any kind in the U. S. In short, it prohibited the recruitment abroad of foreign workers.

A subsequent Supreme Court decision interpreting this act held that, "obviously the thought expressed in this act reaches only to the work of

the manual laborer as distinguished from that of the professional man", and by an amendment in 1891, Congress excepted from the operation of the act, "persons belonging to any recognized profession."

In 1889, A. Seeliger, a German citizen, entered into a contract with Harry L. Laws, to come to the U. S. to work as a chemist on a sugar plantation in Louisiana. His expenses to this country were paid by Mr. Laws, and, in Louisiana, he began working under his employer's direction.

Then, Mr. Laws was indicted and prosecuted for violating the act of 1885. After being argued in the lower federal courts, the case was brought to the Supreme Court. The prosecution contended that Seeliger was not a free agent but a mere employee, hired by his employer, to whose will he was subject. He was not a "chemist", they claimed, but "a chemist on a sugar plantation in Louisiana." He was a chemist only there, and only for purposes which his employment on

that place occasioned. Seeliger's function was to serve his employer and perform the labor prescribed in his contract.

On the other hand, had he been a professional chemist, offering his services to the public at large, holding himself ready to apply his scientific knowledge and skill to all persons who applied for them, he would be entitled to the claim of "belonging to a recognized profession." But as he had contracted to sell his time, labor, and skill in his art to one single, narrow, prescribed service, he could not avail himself of this claim.

Happily, the Court rejected the government's contentions and held that the contract did not violate the act, inasmuch as chemists are members of a recognized profession.

To quote from the Court's opinion:

"The fact that the individual in question, by this contract, had agreed to sell his time, labor and skill to one employer, and in one prescribed branch of the science, does not in the least militate against his being a professional chemist, nor does it operate as a bar to the claim that while so employed he is nevertheless practicing a recognized profession.

"It is not necessary that he should offer his services to the public at large nor that he should hold himself ready to apply his scientific knowledge and skill to the business of all persons who applied for them before he would be entitled to claim that he belonged to and was actually practicing a recognized profession.

"As well might it be said that the lawyer who enters into the service of a corporation and limits his practice to cases in which the corporation is interested thereby ceases to belong to the profession. The chemist may confine his services to one employer so

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long as the services which he performs are of a professional nature.

"It is not the fact that the chemist keeps his services open for employment by the public generally which is the criterion by which to determine whether or not he still belongs to or is practicing a recognized profession. So long as he is engaged in the practical application of his knowledge of the science, as a vocation, it is not important whether he holds himself out as ready to make that application in behalf of all persons who desire it, or that he contracts to do it for some particular employer and some named place."

Chemistry, the Court declared, "is a science, the knowledge of which is to be acquired only after patient study and application. The chemist who places his knowledge acquired from a study of the science to the use of others as he may be employed by them, and as a vocation for the purpose of his own maintenance, must certainly be regarded as one engaged in the practice of a profession which is generally recognized in this country."

As for Seeliger, himself, he remains little more than a name. Whether he continued working in this country or returned to Germany is not known.

COMMUNICATIONS

German reference books contain no mention of him. A curious note is the fact that while the defendant's brief before the Supreme Court stated that Seeliger was a graduate of "the celebrated school at Dormagen, Germany," the German Consulate General has advised that Dormagen, a small town in the Rhineland, has a hospital and a home for juvenile delinquents, but, as far as they can find out, no famous school!

The significance of this case, however, transcends the personality of Seeliger. By fate he happened to be the chemist involved in the controversy, but it could have been some other chemist. The importance of this case to chemists is the fact that this is the first instance in which legal recognition was accorded to their professional status.

—Donald Perrella
Brooklyn, N. Y.

Good Issue

To the Editor:

I enjoyed reading the January CHEMIST since I think it was an outstandingly good number. "After Retirement—What" attracted my attention; Dr. Kelley's article, and that on "Brainstorming Technique." . . .

Page 7, with "Will You Come" is excellent. As a result I am planning to attend the Fairbanks' lecture of the New York Chapter on Feb. 7th.

—Dr. A. H. Warth, F.A.I.C.
Baltimore 18, Md.

Compliment for Dr. Kelley

To the Editor:

The January issue of THE CHEMIST was most interesting. Dr. Kelley's article, Part III, is one of the best I ever read in any professional journal. . . . I am going to use Tables 6 and 7 on pages 25-27 to evaluate my staff.

—Dr. Rudolph Seiden
Kansas City 10, Mo.

Interested

To the Editor:

The January issue of THE CHEMIST caught my eye—or rather, several items in it did so. Will you please send me some information about the AIC? Also include a copy of the code of ethics. . . . I take it that this is something similar to a code of ethics for the MD's. Please also include information about membership.

—Dr. C. L. Meints
Indianola, Iowa

Creativity

To the Editor:

I thoroughly enjoyed Schneider's and Kelley's articles on creativity, in the January CHEMIST.

—Dr. B. S. Friedman, F.A.I.C.
Harvey, Illinois

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Albin H. Warth, Baltimore Chapter
Carl J. Wessel, Washington Chapter
John L. Wilson, Twin City Chapter

Highlights of the December Meeting

The 318th meeting of the National Council was held December 17, 1957, at The Chemists' Club, New York, N. Y., with President Hass presiding. The following officers and councilors were present: Messrs: M. Bender, M. Berdick, A. W. Fisher, Jr., C. H. Fisher, H. B. Hass, K. M. Herstein, F. A. Hessel, H. A. Levey, D. B. Keyes, J. H. Nair, E. Ott, and G. L. Royer. C. L. Brown, chairman

of the Committee on Professional Education; J. H. Faull, Jr., chairman of the New England Chapter; L. T. Eby, chairman of the Membership Committee, and V. F. Kimball were present.

President Hass reported that arrangements had been made to visit all of the AIC Chapters this year.

Emeritus Members

Emeritus membership was conferred on:

Kenneth R. Brown, F.A.I.C.,
Dr. E. Wertheim, F.A.I.C.

COUNCIL

In Memory

Mr. Nair announced with deep regret the deaths of the following:

Homer L. Forbis, F.A.I.C., on

November 3, 1957

Richard O. Hull, F.A.I.C., on

November 29, 1957

Dr. John A. Killian, F.A.I.C. on

December 2, 1957.

A moment of silence was observed in memory of these Fellows.

Committee on Clinical Chemistry

A report by Dr. Kurt M. Dubowski, chairman of the Committee on Clinical Chemistry, concerning the operation of a private clinical laboratory, as previously referred to it, was presented, and the Committee was thanked for its excellent report.

Code of Ethics

A letter was presented from Albert C. Holler, F.A.I.C., suggesting that the AIC Code of Ethics be made available in a form suitable for framing. The matter was referred to the Committee on Ethics.

Annual Meeting Program

Dr. Ott, co-chairman of the Program Committee for the 1958 meeting, reported that the theme, "The Chemist and the Public," would be treated in three professional sessions: The first on the afternoon of April 10th, on "The Chemist and National Defense;" the second on the morning of April 11th, on "The Chemist and Public Education," and the third on the afternoon of April 11th, on "The Chemist and His Community." Dr. Frederick G. Sawyer, also co-chair-

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man of the Program Committee, and Dr. Ott are lining up an excellent group of speakers.

Committee on Professional Education

Dr. Brown, chairman of the Committee on Professional Education, distributed copies of correspondence with the AAAS' Committee on Social Aspects of Science.

Science Teacher Standards

Mr. Herstein stated that he was co-chairman of the Professional Relations and Status Committee of the New York Section of the American Chemical Society, and that he had been instructed to protest the newly promulgated standards of the State Education Department for the certification of high school teachers of science. The Council went on record in

favor of fewer courses in education than at present proposed by the State Education Department, and more emphasis on basic science and mathematics training, as a more desirable background for science teachers in high school.

Committee on Implementing AIC Objectives

Dr. Bender read a letter from Dr. Lloyd A. Hall, chairman of the Committee on Implementing AIC Objectives. The Committee was commended for its progress.

New Directory

The Alabama Chapter requested that the new directory contain a geographical index by states and cities, and the editor was instructed to prepare such a listing.

Number System for AIC Members

Mr. Levey suggested that numbers be assigned to AIC members in sequence according to date of entrance. President Hass was requested to appoint a committee to investigate the practicality of such a number system.

Revision in Application Form

The Committee on Qualifications reported that it wishes some revisions in the present form of application for membership, and that it would like to have reference forms printed. This was referred to the Executive Committee.

Gold Medal Award

Dr. Keyes, chairman of the Committee on Gold Medal Award, an-

nounced that the 1958 Gold Medal would be presented to Lawrence Flett, Hon.AIC, on April 10th in Los Angeles.

Chapter Reports

A letter from Martin B. Williams was presented, reporting that Sen. John Sparkman has spoken before the December 12th meeting of the Alabama Chapter, on "Scientists, Sputniks and Security." Attendance was 110 members, wives, and guests.

Dr. Berdick reported that the New York Chapter would meet in February with the New York Section of the American Chemical Society. The April meeting will be the annual Student Meeting. The Chapter's 1958 Honor Scroll will be presented in June.

Mr. Levey invited AIC members, visiting the area, to speak on professional subjects before the Louisiana Chapter.

Dr. Bender reported that the New Jersey Chapter holds excellent meetings on professional subjects, and that its Professional Advisory Committee is extremely active.

Dr. A. W. Fisher announced that the Honor Scroll of the New England Chapter was awarded to Dr. John A. Timm, director, School of Science, Simmons College, Boston, Mass. President Hass will speak at the March meeting. The Student Awards meeting will be held in May.

COUNCIL

New Members

The following new members were elected:

FELLOWS

Alexander, Dr. Kliem

Supervisor, Research Chemist, Masonite Corp., Laurel, Mississippi.

Branigan, George V.

Vice President, Ungerer & Co., Inc., 161 Avenue of the Americas, New York 13, N. Y.

Goldstein, Harriet S.

Spectroscopy, Hospital for Special Surgery, 535 E. 7th St., New York, N. Y.

Hurt, Oscar L. Jr.

Chief Chemist, Connors Works, H. K. Porter Co., 5000 Powell Ave., Birmingham, Ala.

Kennerly, Prof. William J.

Professor of Chemistry, Head of Department, Alabama College, Montevalle, Alabama.

Lacey, Robert E.

Chemical Engineer, Southern Research Institute, 2000 Ninth Ave. South, Birmingham 5, Alabama.

Laurence, Dr. Alfred E.

Manager, European Office, Central Research Dept., Minnesota Mining & Manufacturing Co., 3 M House, Wigmore St., London W 1, England.

Riehl, Wilbur A.

Chief, General Chemistry Unit, Army Ballistic Missile Agency, Engineering Materials Section, Huntsville, Alabama.

Rivard, Gilbert A.

Research & Senior Research Chemist, G. H. Tennant Co., 701 North Lilac Drive, Minneapolis 22, Minn.

Slifkin, Sam C.

Research, Product Development, Consulting, The S. C. Slifkin Co., 11616 Amherst Court, Plymouth, Michigan.

Steahly, Dr. George W.

Assistant Research Director Monsanto Chemical Co., Nitro, West Virginia.

White, Dr. Wayne E.

Director of Research, Ozark-Mahoning Co., 310 West 6th St., Tulsa, Oklahoma.

MEMBERS

Bruck, Dr. Stephen D.

Research Chemist, E. I. du Pont de Nemours & Co., Inc., Carothers Research Lab., Experimental Station, Wilmington, Delaware.

Crew, Billie

Chemist, Thiokol Chemical Corp., Redstone Division, Huntsville, Alabama.

Huffman, Everett L.

Associate Chemist, Applied Chemistry Div., Southern Research Institute, 2000 Ninth Ave., South, Birmingham 5, Alabama.

ASSOCIATES

Bailey, Truman A.

Analytical Development Chemist, American Cyanamid Co., P. O. Box 10,008, New Orleans, Louisiana.

Douglass, J. Curtis

Teacher of Algebra, Tuscaloosa High School, Tuscaloosa, Alabama.

Mann, James Osborn, Jr.

511 Houston Street, Alexander City, Alabama.

The Nuclear Engineering & Science Conference of the 1958 Nuclear Congress will be held at the International Amphitheatre, Chicago, Ill., March 17-21. For program: Write Congress Manager, American Institute of Chemical Engineers, 25 W. 45th St., New York 36, N. Y.

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John H. Nair, F.A.I.C., following his retirement from the research department staff of Thomas J. Lipton, Inc., announces the opening of offices as consultant to the food industry, at 9 Dunndr Drive, Summit, N. J.

Dr. Ralph G. Van Name, F.A.I.C., research associate emeritus in chemistry at Yale, and a nephew of Josiah Willard Gibbs, was chosen to unveil the bust of Gibbs which was recently installed in the Hall of Fame for Great Americans, at New York University, New York, N. Y. On the Gibbs plaque appears, "One of the principal objects of theoretical research is to find the point of view from which the subject appears in its greatest simplicity."

William A. LaLande, Jr., F.A.I.C., vice president of Pennsalt Chemicals Corp., is chairman of a program to construct a new chemistry building for the University of Pennsylvania, at 34th and Spruce Streets, and to provide it with modern research equipment.

Dr. W. George Parks, Hon. AIC, head of the Department of Chemistry, University of Rhode Island, Kingston, R. I., and director of the Gordon Research Conferences announces that the 1958 conferences will be held from June 9 to Aug. 29th. A complete program will be available in March.

Dr. William H. Bowman, F.A.I.C., general manager, Organic Chemicals Division, American Cyanamid Co., New York 20, N. Y., announces that A. J. Weith, Jr. has been appointed commercial development manager for the division.

J. Robert Bonnar, F.A.I.C., sales manager, General Dyestuff Co. of General Aniline & Film Corp., announces that Lewis R. Waddey has been named branch manager of the Chattanooga, Tenn., sales office.

Dr. Walter A. Taylor, F.A.I.C., has joined, as an associate of the firm, The Dispergent Co., 45-12, 108th St., Corona 68, N. Y., which produces specialized emulsifiers, and has begun an expansion program.

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ABOUT AIC MEMBERS

Morris Mytelka, F.A.I.C., has recently severed connections with Dexter Chemical Co., Bronx, N. Y., where he was chief chemist for twelve years.

Dr. Emmett B. Carmichael, F.A.I.C., professor of biochemistry and chairman of the Department of Biochemistry of the Medical College, University of Alabama, was recently elected chairman of the Gorgas Scholarship Foundation, Inc.

Dr. Allan R. A. Beeber, F.A.I.C., has been appointed vice president for research and development for the Arkwright Finishing Company, Fiskeville, Rhode Island.

Dr. George L. Royer, F.A.I.C., administrative assistant to the general manager of the Research Division, American Cyanamid Co., New York, N. Y., was recently honored by his associates at a luncheon to commemorate his twenty-five years of service at Cyanamid.

John B. Calkin, F.A.I.C., of Calkin & Bayley, Inc., 50 E. 41st St., New York, N. Y., announces that George T. Bayley, executive vice president, has been elected chairman of the Board of Directors.

Raymond Stevens, Hon. AIC, president of Arthur D. Little, Inc., Cambridge, Mass., announces a \$5000 gift to the Boston Museum of Science, to sponsor the Science Explorers Club, a young people's organization.

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Dr. J. S. Long, F.A.I.C., has been engaged as director of The Paint Research Institute, Inc., a research organization of the Federation of Paint and Varnish Production Clubs, 121 So. Broad St., Philadelphia 7, Pa. **Robert W. Matlack**, F.A.I.C., is Treasurer of the Paint Research Institute. The Board of Trustees includes **Harry Burrell**, F.A.I.C., and **Ralph H. Everett**, F.A.I.C.

Dr. W. A. Hamor, F.A.I.C., announces that a new booklet, "Opportunities in Research at Mellon Institute" is available gratis from the Office of Professional Relations, Mellon Institute, 4400 5th Ave., Pittsburgh 13, Pa.

Dr. Roger W. Truesdail, F.A.I.C., president, Truesdail Labs., Los Angeles 65, Calif., announces that F. Leslie Hart has been appointed director of Food and Drug Technology.

Dr. Erich Meyer, F.A.I.C., has been appointed vice president of L. Sonneborn Sons, Inc., New York, N. Y. He was formerly director of the Department of Industrial Research.

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Dr. C. G. Overberger, F.A.I.C., is working on polymer chemistry studies at Brooklyn Polytechnic Institute, Brooklyn, N. Y., under a grant from Chas. Pfizer & Co., Inc. One facet of his studies is the search for means of preventing radiation sickness.

Dr. Ernest H. Volwiler, Hon. AIC, president of Abbott Laboratories, North Chicago, Ill., will receive the Priestly Medal of the American Chemical Society, at the society's 133rd national meeting in San Francisco, Calif., in April, 1958.

Dr. Donald B. Keyes, F.A.I.C., former AIC president, presented the charter to a new student chapter of Omega Chi Epsilon, at Newark College of Engineering, Newark 2, N. J., on December 13th. Omega Chi Epsilon is a national honorary fraternity to recognize high scholarship and original research in chemical engineering.

Jack H. Dolliner, F.A.I.C., is now general manager of Ferro Chemical Corp., Bedford, Ohio, a subsidiary of Ferro Corp. of Cleveland.

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